GOL'TSMAN, B. M.

GOL'TSMAN, B. M. --"The Development and Investigation of a Method of Obtaining Strip of Aluminum and an Al-Cu Alloy Directly from the Liquid Metal." Leningrad, 1956. (Dissertation for the Degree of Candidate in Physicomathematical Sciences.)

So.: Knizhnaya Letopis', No 7, 1956.

AUTHOR: Gol'tsman, B.M. SOV/139-58-6-21/29

TITLE: Cooling of Sheets, Tubes and Thin Rods Drawn Out of a Melt (Okhlazhdeniye listov, trub i tonkikh sterzhney, vytyagivayemykh iz rasplava)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Fizika, 1958, Nr 6, pp 130-136 (USSR)

ABSTRACT: The author discusses a method of manufacture of certain articles directly from melt by drawing through a slot in a horizontal plate placed on the molten metal surface. A seed is immersed in the metal through the slot and it is then withdrawn slowly. In this way sheets, tubes and thin rods can be produced. The method is of particular interest in manufacture of tubes of complex cross-section and in manufacture of articles from materials which are difficult to machine (refractory steels). The paper deals with the steady-state thermal conditions in the process described above. The following assumptions are made: 1) the sheet, tube or rod which is being produced is very long and its furthermost end has reached the ambient temperature T_1 (taken to be equal to 20°C); 2) no local cooling is employed and

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heat loss from the article is a function only of the temperature of the article T (at a particular cross-section) and the ambient temperature T_1; 3) the temperature across the article is assumed to be constant; 4) the rate of withdrawal V, the metal density ρ, the cross-sectional area S and the cross-sectional perimeter p of the article are independent of temperature; 5) the melt crystallises at a definite temperature. Certain molten metals can be treated only in vacuo; the heat is then lost from the manufactured article by radiation only. In this case further assumptions are made: (a) the quantity T_1^4 in the Stefan-Boltzmann law may be neglected; (b) the thermal conductivity, heat capacity and "blackness" coefficient are all independent of temperature. A theoretical analysis shows that for any law of heat loss and for arbitrary dependences of heat capacity and thermal conductivity of the melt on temperature, the ratio k = p/S is directly proportional to the square of the withdrawal

Cooling of Sheets, Tubes and Thin Rods Drawn Out of a Melt SOV/139-58-6-21/29

velocity V. [The paper is entirely theoretical]. There are 5 figures and 10 references of which 8 are Soviet and 2 English.

ASSOCIATION: Leningradskiy Pedinstitut imeni A.I.Gertsena (Leningrad Pedagogical Institute imeni A.I.Gertsen)

SUBMITTED: 4th May 1958

Card 3/3

18.5100

67797

SOV/180-59-5-7/37

AUTHORS: Gol'tsman, B.M., and Stepanov, A.V. (Leningrad)

TITLE: Method of Producing Strip and Tubes Directly from Aluminium and its Alloys

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 5, pp 49-53 (USSR)

ABSTRACT: The authors describe the laboratory automation installation developed by them in 1953-55 for the continuous casting of aluminium and aluminium-alloy strip and tube. The method was proposed by A.V. Stepanov in 1938-41. A plate with a slot of the appropriate contour is placed on the molten surface in a crucible and through the slot a thin plate of the slot contour and made of material wetted by the metal is caused to touch the surface. The metal follows the plate as it is withdrawn and, under suitable cooling conditions, solidifies. The authors' installations consist of a 3 KW resistance furnace with a 170-mm internal diameter graphite crucible; a combined shaper and a cooler unit; a withdrawing mechanism; arrangement for automatically maintaining the liquid level in the crucible constant to ± 1-2 mm. The installations for strip and tube are very

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Method of Producing Strip and Tubes Directly from Aluminium and its Alloys

similar. Fig 1 shows a photograph of the installation on which strip up to 120 mm wide and 0.5-1.5 mm thick has been produced from Al + 4.5% Cu alloy at withdrawing speeds of 5-12 m/hour. A diagram of the shaper-cooler unit is shown in Fig 2. The shaper is preferably made of material with a high thermal conductivity; its top surface is flush with the liquid surface. Metal temperature in the shaper is measured with a thermocouple and regulated to ± 5 °C. A continuous strip over 40 m long has been drawn for up to five hours. Fig 3 shows the installation on which 60- and 100-mm diameter tubes were produced from Al + 4.5% Cu and Al + 12% Si alloys. The shaper (Fig 4) consists of two concentric cast-iron rings attached by cross-pieces and shaped to give a slot convergent upwards. Cooling air is blown on to the emerging tube from a water-cooled ring. The method could be adapted to the production of pipe spirals (Fig 5), or pipes with a complex cross-section. Finned tubes have recently been produced by the authors in collaboration with A.V. Donskiy and V.I. Zaytsev.

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67797

SOV/180-59-5-7/37

Method of Producing Strip and Tubes Directly from Aluminium and its Alloys

There are 5 figures.

SUBMITTED: February 19, 1959

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Card 3/3

GOL'TSMAN, B.M.

Cooling of sheets, pipes and thin rods drawn from a melt. Izv.vys. ucheb.zav.; fiz. no.6:130-136 '59. (MIRA 12:4)

1. Leningradskiy pedagogicheskiy institut im. A.I. Gertsena.
(Drawing (Metalwork))

S/115/60/000/012/016/018
B021/B058

AUTHOR: Gol'tsman, B. M.

TITLE: Thermal Differential Pickup for Level Fluctuations

PERIODICAL: Izmeritel'naya tekhnika, 1960, No. 12, pp. 50-51

TEXT: The author describes a thermal pickup measuring the fluctuations of the level of molten aluminum in a tank within the limits of ± 2 mm with an error of ±0.04 mm. The dependence of the thermo-emf of the thermocouple on its zero point position is illustrated. It is finally stated that the pickup described has a lower inertia than a recorder. It is small and simply designed. Movable and stationary parts do not act upon one another. There is the possibility of connecting the pickup directly to a recorder. There are 2 figures.

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S/564/61/003/000/018/029
D231/D304

AUTHOR: Gol'tsman, B. M.

TITLE: The formation of sheets, round rods and tubes by drawing from molten metal

SOURCE: Akademiya nauk SSSR. Institut kristallografii. Rost kristallov, v. 3, 1961, 408-415

TEXT: Stepanov's method of obtaining sheets, rods and tubes, etc., from molten metal is briefly described. The cross section of the product depends on thermal and capillary conditions of the process. As the former are considered elsewhere, the paper contains a mainly theoretical study of the latter. The following subjects are treated: Formulation of the problem; the external meniscus; the internal meniscus; the dependence of the dimensions of the product on thermal conditions of the process. Approximate formulae are deduced. There are 4 figures and 7 references: 6 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: P. Peck, M. Green, M. Polk, J. Appl. Phys., 24, 1479, 1953.

Card 1/1

S/137/62/000/006/094/163
A160/A101

AUTHOR: Gol'tsman, B. M.

TITLE: The problem of heat transfer in molten metals

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 6, 1962, 12 - 13, abstract 6I74 ("Uch. zap. Leningr. gos. ped. in-ta im. A. I. Gertsena", v. 207, 1961, 243 - 245)

TEXT: Investigated is the problem of the effect of motion of quasi-crystalline units (crystal nuclei) under the effect of gravity or by diffusion on the distribution of temperature in molten metals. The distribution of temperature in a vertical column of commercial molten Sn was investigated. The definite temperature was maintained at the upper and lower base of the column. The temperature at the upper base was kept close to the solidification point, the temperature at the lower base exceeded the solidification point by 10 - 20°C. The diagram of an experimental installation is presented. Readings were taken of the temperature distribution over the section of the molten column, while the temperature at the upper base slowly varied from the beginning of solidification to

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The problem of heat transfer in molten metals S/137/62/000/006/094/163
A160/A101

a temperature exceeding this point by 0.5 - 1°C. The measuring accuracy was ±0.5°C. A linear distribution of temperature was observed over the molten-column section investigated. From the data obtained it is concluded that the heat flux in the molten Sn, due to a motion of quasi-crystalline units, must be < 0.08 cal/cm^2. sec at a temperature gradient of 1 degree/cm. In case it exceeds at least 1 degree/cm in the liquid phase, the mentioned heat flux has no effect on the distribution of temperature.

A. Rusakov

[Abstracter's note: Complete translation]

Card 2/2

GOL'TSMAN, Boris Markovich

[Growing of single semiconductor crystals] Vyrashchivanie poluprovodnikovykh monokristallov. Leningrad, 1963. 30 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy, no.5) (MIRA 17:6)

GOL'TSMAN, B.M.; IKONNIKOVA, G.N.

Determination of elastic modulus and the investigation of the creep of thermoelectric semiconductor materials. Biul.tekh.-ekon. inform.Gos.nauch.-issl.inst.nauch.i tekh.inform. no.12:62-64 '63. (MIRA 17:3)

L [illegible] EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JW

ACCESSION NR: [illegible]

UR/0070/65/010/004/0539/0546

548.55

AUTHOR: [illegible], V. M.; [illegible], D. E.; Donskoy, An. V.; [illegible], A. V.

TITLE: Thermal conditions for the process of crystallization by drawing from a melt

SOURCE: Kristallografiya, v. 10, no. 4, 1965, 539-546

TOPIC TAGS: [illegible] crystallization, thermodynamic property

ABSTRACT: The [illegible] dealt with in the article was developed previously by [illegible] (Stepanov, Zh. tekhn. fiz., v. 29, 381 and 394, 1959 and elsewhere). [illegible] relations for the determination of the thickness of the crystal ([illegible]) as a function of the drawing rate (v), the melt temperature ([illegible]), the heat [illegible] ([illegible]), the height of the crystallization front ([illegible]) [illegible] thermodynamic characteristics of [illegible] the process is stationary, the [illegible] crystallization takes place at a fixed temperature [illegible] thermodynamic characteristics of the [illegible] crystallization parameters, which [illegible] of the material and facilitate comparison of the crystallization conditions of various materials, are introduced

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L [illegible]-66

ACCESSION NR: AP[illegible]

[illegible] crystallization [illegible] metals is compared. The results of [illegible] agreement with experiment. Orig. art. has: [illegible] figures, [illegible] formulas, and [illegible] tables.

ASSOCIATION: [illegible] institut im. A. I. [illegible]

14,55

SUBMITTED: [illegible] ENCL: 00 SUB CODE: SS

NR REF SOV: 005 OTHER: 001

Card 2/2

L 40235-66 EWT(m)/EWP(t)/ETI/EWP(k) JD

ACC NR: AP6019647 SOURCE CODE: UR/0149/66/000/003/0138/0143

AUTHOR: Gol'dfarb, V. M.; Gol'tsman, B. M.; Donskoy, A. V.; Stepanov, A. V. 44 B

ORG: Leningrad State Teachers Institute (Leningradskiy gosudarstvennyy pedagogicheskiy institut)

TITLE: Production of thin-walled products from a melt with air blowing 14

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 3, 1966, 138-143

TOPIC TAGS: molten metal, metal drawing, metallurgic process, cooling

ABSTRACT: A method for the uniform cooling of products by blowing with air is examined. A cooler which provides a high value of the heat-transfer coefficient at a small distance from the crystallization front is described. In this device a stream of air is directed through a blowing slot to the surface of the product and is deflected by it upward and partially downward. Downward blowing depends upon the distance and shape of the edge of the blowing slot; it should not be appreciable since a strong air stream deforms the meniscus of the melt and lowers the temperature of the mold. A strip of the product 5—10 mm wide is under the effect of a normal air flow and adjacent parts of the surface are under the effect of a tangential flow. Various types of coolers are used for cooling products of a complex shape. The velocity of the air flow

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L 40235-66

ACC NR: AP6019647

at the output from the blowing slot when drawing articles is usually several tens of meters per second. At such velocities and normal incidents of the flow on a narrow section of the surface, high values of the heat-transfer coefficient are achieved. The dependence of the thickness of the product on the cooling conditions was investigated by drawing sheets, tubes, and complex shapes. The main method of increasing the drawing rate is to bring the cooling zone closer to the crystallization front even if this means reducing the heat-transfer coefficient. The presence of a buffer zone increases the dependence of thickness on the drawing rate. Orig. art. has: 1 table, 5 figures, and 4 formulas.

SUB CODE: 11,13/ SUBM DATE: 18May64/ ORIG REF: 005/ OTH REF: 000

Card 2/2 Jo

ACC NR: AR6034748 SOURCE CODE: UR/0276/66/000/007/G045/G045

AUTHOR: Gol'dfarb, V. M.; Gol'tsman, B. M.; Stepanov, A. V.

TITLE: Uniform cooling of thin-walled articles drawn from the melt

SOURCE: Ref. zh. Tekhnologiya mashinostroyeniya, Abs. 7G275

REF SOURCE: Uch. zap. Leningr. gos. ped. in-ta im. A. I. Gertsena, v. 265, 1965, 90-104

TOPIC TAGS: metallurgy, metal, metal cooling, cooling

ABSTRACT: A brief analysis is given of five methods of cooling parts drawn from the melt: cooling in a slip mold, cooling in a movable-wall mold, convective cooling in liquid, cooling with a water spray or a water-air mixture, and blasting with air. Computations are presented for estimating the heat regime in cooling drawn ingots. The original article has 2 figures, 4 tables, and 13 bibliographic references. [SP]
[Translation of abstract]

SUB CODE: 11/

Card 1/1 UDC: 621.74.047.2.06

ACC NR: AR6035101 SOURCE CODE: UR/0137/66/000/008/G016/G016

AUTHOR: Gol'dfarb, V. M.; Gol'tsman, B. M.; Donskoy, A. V.; Stepanov, A. V.

TITLE: Thermal conditions for drawing parts from the melt with variuos methods of cooling

SOURCE: Ref. zh. Metallurgiya, Abs. 8G160

REF SOURCE: Uch. zap. Leningr. gos. ped. in-ta im. A. I. Gertsena, no. 265, 1965, 118-143

TOPIC TAGS: metal drawing, cooling, MOLTEN METAL, DRAWN ALUMINUM

ABSTRACT: Test data, diagrams and equations are presented for various conditions of the process of drawing parts from molten aluminum (strips, pipes, and intricate shapes). The prospects are worked out for various methods of cooling while drawing. Orig. art. has: 18 figures and 5 tables. The bibliography contains 22 titles. A. Tseydler. [Translation of abstract] [NT]

SUB CODE: 13/

Card 1/1 UDC: 669.71.04

ACC NR: AP6023643 SOURCE CODE: UR/0149/66/000/002/0154/0161

AUTHOR: Gol'dfarb, V. M.; Gol'tsman, B. M.; Donskoy, A. V.; Stepanov, A. V.

ORG: Chair of General Physics, Leningrad State Pedagogical Institute (Leningradskiy gosudarstvennyy pedagogicheskiy institut. Kafedra obshchey fiziki)

TITLE: Thermal conditions for producing thin-walled products from a melt

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 2, 1966. 154-161

TOPIC TAGS: metal casting, convective heat transfer, thermal analysis, temperature distribution, optimization

ABSTRACT: Thermal conditions and process parameters for the continuous casting of thin-walled products from a melt are given. Four cooling methods are described: 1) drawing from a melt with the crystal front sliding across water-cooled metal shoes; 2) convective cooling in a liquid; 3) convective cooling in a liquid without a buffer zone; 4) by air-blast or water spraying. For method (1) so much friction results from the ingot-wall interface that wall thicknesses must be maintained above 5 mm. Heat conduction coefficients varied from 1000 kcal/m^2-deg-hr for (1) to 2000-10,000 kcal/ /m^2-deg-hr for (4). The temperature was given as a function of *x—the vertical coordinate*, by the equation

$$T = T_0 \exp\left[\frac{c\rho v}{2\lambda}\left(1 - \sqrt{1 + \frac{4\alpha\lambda}{lc^2\rho^2 v^2}}\right)x\right],$$

UDC: 669.017: 621.77

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ACC NR: AP6023643

where c is specific heat, ρ is density, v is velocity, λ is thermal conductivity and α is the surface coefficient. Casting thickness l is related to a group of heat transfer parameters which were listed for 25 metals and alloys. Values of l are given for 10 metals drawn from the melt at 10 m/hr for cooling by radiation and self convection (α=100 kcal/m^2-deg-hr). The effect of the heat transfer rate in the liquid portion of the melt on thickness is also given. Nomographs are shown for determining the relation between strip thickness, gap width of molds and the extraction conditions. Data are presented for aluminum in which thickness is given as a function of v, α and ΔT--the superheat--for different parameters and casting methods. For a particular thickness, the necessary gap width s_0 was determined from $s_0 = s \pm (0.1-0.2)$ mm, where $s=2(l)$. Orig. art. has: 6 figures, 4 tables, 9 formulas.

SUB CODE: 13,20/ SUBM DATE: 18May64/ ORIG REF: 009

Card 2/2

GOL'TSMAN, D.I.

SAGARADZE, V.S., kand.tekhn.nauk, red.; GOL'TSMAN, D.I., inzh., retsenzent; YERMAKOV, N.F., tekhn.red.

[Practices of plant metallographic laboratories] Iz opyta raboty zavodskoi metallograficheskoi laboratorii. Moskva, Gos.nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1957. 82 p. (MIRA 11:2)
(Metallography)

GOL'TSMAN, F.M.

Using microwave methods for investigating the dielectric properties of certain quasi-liquid crystals. Vest. LGU 8 no.5:73-81 My '53.
(MIRA 12:7)

(Liquid crystals--Electric properties)

GOL'TSMAN, F.M.

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[illegible] up to the [illegible]. The dipole moments of II, I, camphor, bornyl chloride, borneol, and cyclohexanol in dil. solns. in C_6H_6 or CCl_4 were 3.7, 3.0, 3.0, 2.0, 1.2, and 1.7 D., resp. The dipole moments of I, camphor, bornyl chloride, borneol, and cyclohexanol as the pure substances (from the Onsager equation) were 2.4, 2.2, 1.4, 1.2, and 1.3 D., resp. In solns., increases in concn. affect t_{max} (temp. at which max. dielec. losses start) very little for camphor and bornyl chloride, more strongly for borneol and cyclohexanol, and quite strongly for II. The relaxation time τ in the solid state for all of the substances except II differs little from the relaxation times in the case of solns. The rotational energies were calcd. by analyzing the curves $\log \tau = f(1/T)$. Mols. of camphor and bornyl chloride have rotational energies close to those of liquids such as bromobenzene and butyl bromide. The rotational energy of mols. of I is considerably larger. The largest rotational energy was found in mols. of borneol and cyclohexanol; this tends to confirm the existence of H bonds above the range of polymorphous transitions for these substances.

Aubrey P. Altschuller

GOL'TSMAN, F.M.

On the spectrum analysis of seismic waves. Vest.Len.un.9 no.2: 105-114 F '54. (MLRA 9:7)
(Seismometry) (Oscillograph)

Goltsman F.M.

USSR/Physics - Electronic Filters FD-914

Card 1/1 Pub 153-23/26

Author : Goltsman, F. M.

Title : Vibrational filters of low frequency

Periodical : Zhur. tekh. fiz. 24, 1350-1353, Jul 1954

Abstract : Suggests electromechanical systems of low-frequency narrow band filters in which the filtered current generates audio vibrations which are transformed back into electric current. Computes corresponding circuit diagrams. Three references.

Institution : --

Submitted : March 30, 1953

GOL'TSMAN, F.M.

Graphic method for the frequency analysis of seismic waves.
Vest.Len.un. 11 no.16:45-56 '56. (MLRA 9:11)
(Seismometry--Graphic methods)

GOL'TSMAN, F. M.

MATVEYEVA, N.N.; SMIRNOVA, Z.M.; KUSTOVA, Z.M.; VASIL'YEVA, M.V.; GEL'CHINSKIY, B.Ya.; OZEROV, D.K.; MAMUKHOV, A.V.; GOL'TSMAN, F.M.; PETRASHEN', G.I., red.; VOLKHOVER, R.S., tekhn. red.

[Papers on the quantitative study of seismic wave dynamic] Materialy kolichestvennogo izucheniia dinamiki seismicheskikh voln. Pod. rukovodstvom i red. G.I.Petrashen'. [Leningrad] Izd-vo Leningr. univ. Vol. 1. 1957. 420 p. Vo.2. 1957. 152 p. (MIRA 11:2)

1. Akademiya nauk SSSR. Matematicheskiy institut, Leningradskoye otdeleniye.
(Seismometry)

49-5-4/18

AUTHOR: Gol'tsman, F.M.

TITLE: Application of linear systems for filtering complex oscillations. (Primeneniye lineynykh sistem dlya fil'tratsii slozhnykh kolebaniy).

PERIODICAL: "Izvestiya Akademii Nauk, Seriya Geofizicheskaya" (Bulletin of the Ac.Sc., Geophysics Series), 1957, No.5, pp.584-594 (U.S.S.R.)

ABSTRACT: In numerous branches of physics and geophysics it is necessary to decipher complex super-positions of recorded oscillations for the purpose of determining the instant of arrival and the shape of individual components of the recording. To facilitate deciphering of the recordings frequency, filtration by means of linear four-poles is frequently applied, the filtration properties of which are determined by their amplitude-phase frequency characteristics. In numerous cases filters are used with such frequency characteristics that they satisfy only approximately the requirements for a given range and the filter characteristics may not always be the most rational ones. At present there is a tendency to change over to undistorted recording of signals, for instance, on a magnetic tape, ensuring reproduceability and evaluation of the signals under

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Application of linear systems for filtering complex oscillations. (Cont.) 49-5-4/18

The theory is considered of filters transforming signals in a predetermined way and, as an example, the function of the natural oscillations is determined for a filter which compresses signals along the time axis. This example is one of the cases of high frequency filter applied for improving the deciphering ability of the recordings. The problems of designing the apparatus and practical utilisation of the presented ideas and filtration circuits are not considered in the paper. It is, however, mentioned that correlation methods of evaluating seismograms are very similar in their concept to the here developed idea of "universal" filtration and that existing apparatus for calculating correlation functions could probably be adapted for calculating the above mentioned "scanning integral".

There are 6 figures and 4 references, 3 of which are Slavic.

SUBMITTED: March 29, 1956.

ASSOCIATION: Leningrad State University imeni A. A. Zhdanov. (Leningradskiy Gosudarstvennyy Universitet im.A.A. Zhdanova)

AVAILABLE: Library of Congress

Card 3/3

GOL'TSMAN, F.M.

54-4-10/20

AUTHOR: Gol'tsman, F. M.

TITLE: The Graphoanalytic Method of Seismic Waves Frequency Analysis in the Wide Frequency Range (Grafoanaliticheskiy metod chastotnogo analiza seysmicheskikh voln v shirokom diapazone chastot)

PERIODICAL: Vestnik Leningradskogo Universiteta Seriya Fiziki i Khimii, 1957, Vol. 22, Nr 4, pp. 76-88 (USSR)

ABSTRACT: The majority of existing methods of the frequency analysis either requires an expensive mechanical equipment or extensive and rather tedious calculations. The finding out of simple and quick possibilities of analysis by means of the Fourier's series, which can be applied in the seismographic practice, seems to meet the purpose. The method cited in the title is demonstrated. The series are added as special nomographs. The method makes it possible to obtain 36 points of a complex spectrum stored in one frequency band. The upper limit depends on the time intervall between the signal values. There are 4 figures, 4 tables, and 3 references, 3 of which are Slavic.

Card 1/2

The Graphoanalytic Method of Seismic Waves Frequency Analysis in the Wide Frequency Range 54-4-10/20

SUBMITTED: February 20, 1957

AVAILABLE: Library of Congress

Card 2/2

GOL'TSMAN, F.M.

3(6,10) PHASE I BOOK EXPLOITATION SOV/1387

Vsesoyuznyy nauchno-issledovatel'skiy institut geofizicheskikh metodov razvedki

Prikladnaya geofizika; sbornik statey, vyp. 21 (Applied Geophysics; Collection of Articles, Nr 21) Moscow, Gostoptekhizdat, 1958. 221 p. 3,000 copies printed.

Additional Sponsoring Agency: U.S.S.R. Ministerstvo geologii i okhrany nedr.

Ed.: Polshkov, M.K.; Exec. Ed.: Kuz'mina, N.N.; Tech. Ed.: Mukhina, E.A.

PURPOSE: This collection of articles is intended for engineering and technical personnel and those interested in the methodology and practice of geophysical surveying.

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COVERAGE: The authors discuss the development and improvements in the technology and methodology of geophysical surveying. Two of the articles describe graphic-analytical methods of frequency analysis and synthesis of oscillations; others present a geological interpretation of geophysical observations in certain areas of the USSR. The articles devoted to industrial application present a detailed analysis of neutron-neutron logging, side-wall coring, and the method of induced potential fields. The last article describes the conventional symbols accepted in applied geophysics. The articles are accompanied by tables, diagrams and bibliographic references.

TABLE OF CONTENTS:

Applied Geophysics (Cont.) SOV/1387

Card 3/4

AUTHOR: Gol'tsman, F.M. 54-10-26/16

TITLE: A Heterodyne Analyzer of Harmonics Within the Range of Low Sound Frequencies (Geterodinnyy analizator garmonik v diapazone nizkikh zvukovykh chastot)

PERIODICAL: Vestnik Leningradskogo Universiteta, Seriya fiziki i khimii ., 1958, Vol. 10, Nr 2 , pp. 71-74 (USSR)

ABSTRACT: In this article a device is described which is intended to be used for the analysis of the frequencies of complicated periodic and non-periodic oscillations of the electric current in the interval of from 0 to 1000 c. Owing to the application of a tuning-fork filter the device has a very narrow transmission band (some tenths of a cycle). The device can be used for the purpose of investigating nonlinear distortions of various radiotechnical devices. Together with an electromechanical transmitter it can be used for the analysis of the vibrations of dams, bridges, and other buildings as well as for the analysis of the frequency of seismic waves etc. The construction of the scheme takes special account of the demands made as to the greatest simplicity and economy during operation under field conditions. The basic scheme

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is shown (fig. 1). Before operation is started, the scheme must be balanced. Measurements are carried out by means of a slow modification of the frequency f_{het} in the interval (1). The maximum travels of the indicator of the microamperemeter and the corresponding f_{het} are fixed on this occasion. The genuine frequencies are determined by simple recomputation according to the formula $f = f_{het} - f_{f}$. In the case of the frequency analysis of non-periodic pulses the signal must first be plotted in such a manner that its frequent repetition in form of electric pulses is warranted. As is known, the spectrum, in the case of periodic repetitions of the pulses, is transformed from a continuous into a discrete spectrum. The lines of the discrete spectrum within the curve of a continuous spectrum develop as in an envelope. The interspaces on the frequency axis between the lines of the discrete spectrum are equal to the repetition frequency. Thus it is possible, when "reeling off" the signal, to determine the continuous spectrum of the signal according to points by the investigation of a discrete spectrum by means of a special device. The rarer the repetition frequency, the greater will be the number of points that can be

A Heterodyne Analyzer of Harmonics Within the Range of Low Sound Frequencies 54-10-2-6/16

determined by analysis. The very narrow transmission band of the analyzer described makes it possible to reduce the repetition frequency down to 3 c. There are 3 figures, and 3 Soviet references.

SUBMITTED: December 25, 1956

AVAILABLE: Library of Congress

1. Frequency analyzers—Design 2. Electronic equipment—Testing equipment 3. Structures—Vibration—Analysis 4. Vibration —Analysis—Equipment

Card 3/3

GOL'TSMAN, F.M.; KALININA, T.B.

Simple methods of frequency analysis and synthesis and their use in solving some geophysical problems. Prikl.geofiz. no.21: 3-25 '58. (MIRA 12:1)

(Vibration)

GOL'TSMAN, F.M.; LIMBAKH, Yu.I.

Apparatus for frequency analysis and synthesis of irregular signals. Prikl.geofiz. no.21:26-36 '58. (MIRA 12:1)
(Vibration)

VOLIN, A.P.; GOL'TSMAN, F.M.

Practical directions for the use of the analyticographical method in the frequency analysis of seismic waves. Vop.din.teor. raspr.seism.voln. no.2:95-105 '59. (MIRA 13:5)
(Seismometry)

GOL'TSMAN, F.M.; LINBAKH, Yu.I.; MOISEYEV, O.N.; CHICHINOV, I.S.

Some uses of nonlinear schemes for frequency transformations in seismic apparatus. Vop.din.teor.raspr.seism.voln. no.2: 268-289 '59. (MIRA 13:5)

(Seismometry)

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Translation from: Referativnyy zhurnal, Geofizika, 1960, No. 6, p. 34, # 5789

AUTHORS: Gol'tsman, F. M., Limbakh, Yu. I.

TITLE: A Device for Analyzing the Frequencies of Seismic Waves Under Stationary Conditions

PERIODICAL: V sb.: Vopr. dinamich. teorii rasprostr. seysmich. voln. 2. Leningrad, Leningr. un-t, 1959, pp. 290-303

TEXT: A device is described for determining the amplitude spectra of seismic pulses. The device is based on the known principle of replacing the analysis of single pulses by the harmonical analysis of a periodical sequence of the same pulses. The primary signals are recorded by the method of variable width. The multiple reproduction of the pulses to be analyzed is realized by means of photoelectric reproduction in reflected light. The photoelectric "record player" is driven by an electromotor. A contact device is provided in the record player for starting the intermitting relay. The analysis is carried out by a heterodyne analizer. The heterodyne adjustment axis is connected to the record player by a step gear providing for some different rates of varying

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A Device for Analyzing the Frequencies of Seismic Waves Under Stationary Conditions

the frequency. The spectrum is recorded visually by a microammeter and simultaneously by the MПО-2 (MPO-2) oscillograph. The signal reproduction rate is not dependent on the registration rate and may be chosen arbitrarily. The device is applicable to analyzing pulses, the spectra of which are in any range. The relative error in determining the spectral line intensity amounts on the average to 5%. There are 7 references.

O. G. Shamina

Translator's note: This is the full translation of the original Russian abstract.

X

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APPROVED FOR RELEASE: 09/24/2001 CIA-RDP86-00513R000515830002-7"

82846

6.9000

S/112/60/000/009/003/006

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1960, No. 9, p. 232, # 4.7899

AUTHOR: Gol'tsman, F. M.

TITLE: Problems Concerning the Frequency Theory of Grouping

PERIODICAL: V sb.: Vopr. dinamich. teorii rasprostr. seysmich. voln. Vol. 2, Leningrad, Leningr. un-t, 1959, pp. 322-340

TEXT: The author investigates frequency methods of dividing signals which makes it possible to group them according to their different characteristics. The existing methods are based on the analysis of the summation effect of stationary harmonic oscillations or on the power method of rating the efficiency of the groups. These methods are very little applicable for the grouping of unsteady signals. The positions to be set forth can be taken as the basis of a general theory of grouping and can be used for the registration of seismic oscillations and for an analysis of the mixer operation. Considering that seismic signals represent a series of separate waves which are spreading with different velocities v along the profile x, the signal spectrum, recorded by

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an infinite number of seismographic recorders with a distribution of their amplification coefficient ~~H(x),~~ can be represented by the equation $S_{out}(\omega) = S(\omega)H(\frac{\omega}{v})$, where S_ω is the signal spectrum, $H(\frac{\omega}{v}) = \int_{-\infty}^{+\infty} h(x)e^{-j\omega\frac{x}{v}}dx$ is the complex frequency characteristic of the group, $h(x)$ is the distribution function of the amplifying factor of the receivers. From this follows that grouping is equivalent to the filter action with the characteristic $H(\frac{\omega}{v})$. The synthesis of the continuous group is reduced to the fining of such an $H(\frac{\omega}{v})$ characteristic which, under the given condition, transforms the $S(\omega)$ spectrum into the $S_{out}(\omega)$ spectrum. The separation of signals with the same spectra but different velocities is effected by the filtration of the wave velocities of propagation. The author cites graphs and analytical expressions for some typical $H(\frac{\omega}{v})$ characteristics and their distribution functions which make it possible to carry out filtration. Thus it is possible to use a combination of the given characteristics and their deformation (elongation along the axis $\frac{\omega}{v}$ or splitting into 2 symmetric lateral spectra). Practically, it is necessary to determine the discrete distribution equivalent to the given constant. For this purpose, the expansion in the Fourier series is used. The synthesis of the discrete group is carried out in the following succession: the $H(\frac{\omega}{v})$ characteristic is selected; by its convolution the function $h(x)$ is found; the half period of steration is selected in such a way that $\omega_0 > \omega_{gr}$; the intervals $\Delta_x = \frac{\pi v}{\omega_0}$

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Problems Concerning the Frequency Theory of Grouping S/112/60/000/009/003/006

are determined; inside the continuous curve h(x) vertical lines are inscribed at a distance of Δx from each other. The author cites 2 practical examples of a group synthesis for the case of interference of two waves with different given velocities of propagation and given ratio of velocity. The mixer circuit is investigated which is designated for the analysis and synthesis of signals being supplied from a great number of seismographic receivers. A deficiency of the grouping method set forth is the necessity of displacing the total of seismic receivers in order to obtain intermediate recordings in case the magnitude Δx proves to be too great. The main advantage of the method is the fact that the number of seismic receivers can be reduced. The method comprises all possible distributions including irregular ones along the x profile. There are 8 references.

I. V. G.

Translator's note: This is the full translation of the original Russian abstract.

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A005/A001

Translation from: Referativnyy zhurnal, Geofizika, 1960, No. 10, p. 48, # 12003

AUTHOR: Gol'tsman, F.M.

TITLE: The Frequency Theory of Speed Filtration

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PERIODICAL: V sb.: Vopr. dinamich. teorii rasprostr. seismich. voln. 2. Leningrad, Leningr. un-t, 1959, pp. 341-360

TEXT: The frequency theory of speed filtration is the generalization of the grouping frequency theory; it considers, on the basis of spectral presentations of signals, the problems of signal grouping in space, in time, as well as the combined grouping in time and space simultaneously. The general tenets of the frequency theory of speed filtration are explained and practical formulae are presented for synthesizing groups in cases of separate and combined grouping of sources and receivers of vibrations. The group synthesis methods are based on a graphical-analytical method of analysis and synthesis of seismic signals, which was developed by the author.

A.S. Alekseyev

Translator's note: This is the full translation of the original Russian abstract.

Card 1/1

GOL'TSMAN, F.M.

Frequency theory elements of the controlled direction method. Vop.din.teor.raspr.seism.voln. no.2:361-378 '59. (MIRA 13:5)

(Seismometry)

6.9000
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66879
SOV/54-59-4-5/22

AUTHOR: Gol'tsman, F. M.

TITLE: On the Theory of Linear Transformation of Signals

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1959, Nr 4, pp 33-38 (USSR)

ABSTRACT: In order to separate information signals from noises, linear transformations of the resultant signals are employed in many physical observations. One of these transformations, the integral transformation which is carried out by means of the contraction formula, is discussed here. The transformed signal F_2 is obtained from the F_1 to be transformed by the relation:

$$F_2(t) = \int_{-\infty}^{+\infty} F_1(t-\tau)h(\tau)d\tau \quad (1).$$ In discrete form it reads:

$$F_2(t) = \sum_{k=-\infty}^{\infty} F_1(t-k\Delta t)\Delta t h(k\Delta t) \quad (2).$$ The function h corresponds to the density of the transformation weight function.

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On the Theory of Linear Transformation of Signals SOV/54-59-4-5/22

$\Delta t h(k\Delta t)$ are the coordinates of the weight function in discrete transformation. The discrete form is of practical value for the approximation calculation of the first form as well as in those cases in which the weight function is discontinuous. To be able to evaluate the effectiveness of transformations, the following spectrum formula is employed, which is analogous to formula (1): $S_2(\omega) = S_1(\omega)H(\omega)$ (3), where $S_2(\omega)$, $S_1(\omega)$, $H(\omega)$ denote the Fourier transformations of the functions $F_2(t)$, $F_1(t)$, $h(t)$. Next, the spectral analogon of (2) is now sought by means of which the principal properties of the discrete transformation are investigated. First, it is shown that the discrete form of the integral transformation may be represented by substituting the periodic function

$H_{per}(\omega) = \sum_{p=-\infty}^{+\infty} H(\omega - 2p\,\omega_0)$ (4) into (3). The principal proper-

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SOV/54-59-4-5/22

On the Theory of Linear Transformation of Signals

ties of the discrete transformation are the following: The weight function of the discrete transformation is characterized by the envelope of h(t) which defines the form of the summands $H(\omega)$ of the periodic spectrum (4), and by the distances Δt. When the envelope of h(t) is elongated (or compressed) and Δt is simultaneously elongated (or compressed), the spectrum $H_{per}(\omega)$ is proportionally elongated or compressed so that both remain similar. When only Δt is elongated or compressed, the period $2\omega_o$ of the repetition of H_{per} is compressed and elongated in propotion to Δt within the limits of each period. H remains unchanged. With large Δt, the neighboring periods are superimposed. If only h(t) is elongated and compressed, H_{per} is elongated and stretched within the limits of each period. Consequently, the discrete spectrum may be used to filter signal frequencies. The spectrum $H(\omega)$ is to be calculated in such a manner that in the case of periodic repetition this separation is not blurred by the main period of H_{per} and the secondary periods. With the aid of the reciprocal Fourier transformation

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On the Theory of Linear Transformation of Signals SOV/54-59-4-5/22

it is possible to calculate Δt for this purpose. Finally, some indications are given for the calculation of the signal frequency filtration and accumulation. There are 3 Soviet references.

SUBMITTED: January 15, 1959

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SOV/49-59-4-6/20

AUTHOR: Gol'tsman, F. M.

TITLE: On Selecting the Frequency Characteristics of Filters for Seismic Signals (O vybore chastotnykh kharakteristik fil'trov seysmicheskikh signalov)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1959, Nr 4, pp 549-559 (USSR)

ABSTRACT: The basic factors affecting the relationship of the character of the spectrum and the length of the impulse or of the character of the signal and the limiting frequency of its spectrum was investigated by the author. The signal $F_1(t)$ (Eq 1), the first derivate of which has no infinite break, was analyzed for the time t and frequency ω. The spectrum $S_1(\omega) = A_1(\omega) + iB_1(\omega)$ was considered for the duration $-T \leq t \leq T$, the basic equations of which are defined as Eq (2). As it can be seen from these equations, the functions $F_1(t)$, $A_1(\omega)$ and $B_1(\omega)$ can be determined for the points $k\Delta t$ and $k\Delta\omega$. This can be done when the effective duration and the moment of damping will be found for the spectrum, as illustrated in Fig 1,a. The distance $\Delta\omega$ is chosen, for which the function of readings $A_1(\omega)$ and $B_1(\omega)$

Card 1/4 and the functions of difference $\Delta A(\omega) = A(\omega)-A_1(\omega)$ and

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On Selecting the Frequency Characteristics of Filters for Seismic Signals

$\Delta B(\omega) = B(\omega) - B_1(\omega)$ (Fig 1,б) are calculated. Then the energy ΔE is determined from the formulae on p 552. In order to determine the moment of entry, the value of the spectrum $S(\omega)$ is multiplied by:

$$e^{i\omega T} = e^{i0.056\omega} .$$

The resulting spectrum $S'(\omega)$ is shown in Fig 2, which corresponds to the middle part of the curve in Fig 3. The functions $A_1(\omega)$, $B_1(\omega)$ or $F_1(t)$ can be easily determined from the nomograph shown in Fig 4. The values of the functions are found first for the points $t = (n + 1/2)\Delta t$ and $\omega = (n + 1/2)\Delta\omega$, using the formulae on p 554. The nomogram consists of the horizontal axis xx', and of a number of parallel, vertical lines at distances $(k + 1/2)\Delta x$ from each other ($k = -15...-2,-1,0,1,2,...15$). In order to find the solution it is sufficient

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On Selecting the Frequency Characteristics of Filters for Seismic Signals

to plot a given function on a piece of transparent paper which is placed on the nomogram so that the values Δt or $\Delta\omega$ of the curve are equal to Δx . Then, the curve is moved by distances $(n + 1/2)\Delta t$ or $(n + 1/2)\Delta\omega$. Then the algebraic sum of values is made, as read from the points of intersection of the curve and the vertical axis of the nomogram (dotted lines represent negative values). It can be seen that the values of the difference functions depend on the degree of inclination in respect to the axis xx* which is illustrated in Fig 5. When a curve is represented in the form of a succession of straight lines (Fig 6,5), the limit frequency $\omega_{lim} = \pi/\Delta t$ is determined in degrees of inclination (Fig 6,a). This is also illustrated in Figs 7, where the frequencies of three various filters are shown in (a) and the corresponding functions of the specific vibrations are shown in б (Refs 3 and 4). This effect of inclination

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On Selecting the Frequency Characteristics of Filters for Seismic Signals SOV/49-59-4-6/20

should be considered when the filters for seismic signals are designed. There are 7 figures and 4 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

SUBMITTED: November 12, 1957.

Card 4/4

SOV/49-59-11-9/28

AUTHORS: Kalinina, T. B., and Gol'tsman, F. M.

TITLE: A Nomographic Method of Determination of Output Signals in Linear Filtered Systems

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1959, Nr 11, pp 1605-1618 (USSR)

ABSTRACT: An approximate nomographic method of calculating the "coagulating" integral of a linear transformation of signals is described. The integral combines an input signal with that of output and with the function of free vibrations. The calculation is performed by means of graphs and tables, i.e., the resultant function is found as a point on the abscissa. The theoretical considerations are based on the formula (1) defining an output signal F_{vykh} (t) where F (t) - input signal, h (t) - function of specific vibrations. In order to solve the integrals of Eq (1), it is necessary to express them as the sum of the functions F(t) and h(t),(Eq (3a)). This is illustrated in Fig 1, which shows a substitution of the spectrum H(ω) (curve 2) by a periodic spectrum S(ω) (curve 1). The error of

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SOV/49-59-11-9/28

A Nomographic Method of Determination of Output Signals in Linear Filtered Systems

this transformation can be minimised if the auxiliary functions $F'(t)$ and $h'(t)$ are introduced. The curves in Fig 2 show how this can be done (a - determination of errors ΔF and Δh, b - substitution of spectrum $\delta(\omega)$ by limited spectrum $\delta^{(n)}(\omega)$, B - substitution of limited spectrum $\delta^{(n)}(\omega)$ by a periodic spectrum $\delta^{(n)}_{per}(\omega)$.

A typical nomogram constructed for solving the formula (3a) is shown in Fig 3. It represents the horizontal axis t where the vertical lines are drawn from the points $t = k\Delta t$ ($k = -3, -2, -1, 0, 1, 2, 3 ....$). The vertical lines are divided into lengths, each equal to $h(k\Delta t)$. A detailed description of the procedure of finding an output signal $F_{vykh}(t)$ is given in four numerical examples, the results of which are illustrated by graphs. They represent the following: Fig 4a - the initial functions $F(t)$ (curve 1) and $h(t)$ (curve 2); b - error curves $\Delta F(t)$ and $\Delta h(t)$; Fig 5 - calculated output signal $F_{vykh}(t)$ (see Fig 4); Fig 6 - initial functions $F(t)$ (1), $h(t)$ (2) and error curves $\Delta F(t)$ (3), $\Delta h(t)$ (4); Fig 7 - calculated

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SOV/49-59-11-9/28

A Nomographic Method of Determination of Output Signals in Linear Filtered Systems

output signal $F_{vykh}(t)$ (see Fig 6); Fig 8a - initial functions, b - calculated output signal; Fig 9 - initial input signals: a - $\varphi(t)$ and b - $F(t)$; B - calculated output signal. There are 9 figures, 1 table and 7 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet imeni A. A. Zhdanova (Leningrad State University, imeni A. A. Zhdanov)

SUBMITTED: December 17, 1958

Card 3/3

S/049/60/000/01/002/027
E201/E191

AUTHOR: Gol'tsman, F.M.

TITLE: Frequency Theory of Interference Systems. I.

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1960, No 1, pp 7-23

TEXT: An interference system is defined here as a set of independent receivers or sources of vibrations. The synthesis of such systems is considered in order to distinguish waves with different apparent velocities in the directions of the coordinate axes. In general, such synthesis is reduced to a selection of three-dimensional frequency characteristics and calculation of the inverse Fourier integral. Frequency characteristics of discrete systems are found to be periodic. Also considered are the main assumptions of the theory of velocity "filtering", which is used to select frequency characteristics. Examples are given of the synthesis of interference systems, using assumed values of apparent velocities of wanted and unwanted waves. 12
The paper is entirely theoretical.

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Frequency Theory of Interference Systems. I.

Acknowledgements are made to G.I. Petrashen' for advice.
There are 6 figures, 2 tables and 4 Soviet references.

ASSOCIATION: Leningradskiy gusodarstvennyy universitet im. A.A. Zhdanova
(Leningrad State University imeni A.A. Zhdanov)

SUBMITTED: April 27, 1959

Card 2/2

√B

S/054/60/000/02/08/021
B022/B007

AUTHOR: Gol'tsman, F. M.

TITLE: The Theory of the Methods of Signal Accumulation on a Correlated Noise Background

PERIODICAL: Vestnik Leningradskogo universiteta. Seriya fiziki i khimii, 1960, No. 2, pp. 59-71

TEXT: In the present paper, the attempt is made to deal with some general statements made in the theory mentioned in the title. This is carried out on the basis of a frequency analysis and Fourier synthesis, as such a treatment is very illustrative and general in the case of a steady noise. Practical methods and examples are mentioned for a proper choice of the parameters in accumulation systems in various systems. Fig. 1 shows the noise spectra $W(\omega)$, which are mainly located within the range $-\Omega \leq \omega \leq \Omega$ with the same mean square amplitude a. The corresponding dependence of the mean square amplitude a_{in} and of the ratio A_{in}/a_{in} on Δt is given in Fig. 2. The noise spectra dealt with are shown in Fig. 3, whereas the corresponding dependence of the mean square amplitude a_{in} and

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The Theory of the Methods of Signal Accumulation on a Correlated Noise Background

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also the signal to noise ratio upon the length of the intervals Δt is given in Fig. 4. The limiting value of the signal to noise ratio A_{in}/a_{in} in the case of a given accumulation period may be seen in Fig. 5. The noise spectrum $W(\omega)$ of a given noise is shown in Fig. 6. The noise spectrum of the noise is given in Fig. 7 for a duration of the useful signals of 9 msec. There are 7 figures and 4 Soviet references.

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AUTHOR: Gol'tsman, F.M.

TITLE: Frequency Theory of Interference Systems. II

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1960, Nr 2, pp 209-222 (USSR)

ABSTRACT: A synthesis of the results obtained from the theoretical considerations described in this journal, Nr 1, 1960, is attempted. Spatial determination of the frequency characteristics based on Eq (1) is shown as Eq (2), (3), (3a) and (3b). Typical examples of the spatial frequency characteristics of the interference systems are illustrated in Fig 1 to 6, where Fig 1 represents the set of curves $|H_x'| = R_x$ on the plane $\theta = 0$; Fig 2 shows a set of curves $|H'| = R$ on the plane $\theta = 0$; Fig 3 gives $|H'| = R$, $\theta = 0$ for the various values of the relation v/c_x; Fig 4 characterizes the interference system with a hypothetical advancing wave on the plane $\theta = 0$ for $v/c_x = 0.5$; Fig 5 shows $|H'|$ for three different directions φ; Fig 6 gives the synthesis of the uniform interference system with

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selected frequency characteristics. Fig 7 shows the same as Fig 6 but for a hypothetical advancement. Fig 8 gives the synthesis of a two-dimensional interference system with selected spatial frequency characteristics. The spectrum $S_{Bb1X}(\omega)$ of the output signal of the interference receivers and transmitters is defined by Eq (7). There are 8 figures and 3 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A.A.Zhdanova (Leningrad State University imeni A.A.Zhdanov)

SUBMITTED: June 27, 1959

Card 2/2

GOL'TSMAN, F.M.

Frequency theory of the grouping of signals against a background of correlated noises. Izv.AN SSSR.Ser.geofiz. no.6:769-780 Je '60. (MIRA 13:6)

1. Leningradskiy gosudarstvennyy universitet im. A.A.Zhdanova. (Seismometry)

GOL'TSMAN, F.M.; KEYL'MAN, Yu.N.

Universal filter for seismic signals. Prikl.geofiz. no.25:55-65 '60. (MIRA 13:6)
(Seismometers)

86203

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E192/E382

69200

AUTHOR: Gol'tsman, F.M.

TITLE: Frequency Theory of Grouping the Signals in the Presence of Correlated Noise

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1960, No. 6, pp. 769 - 780

TEXT: An attempt is made to generalise the frequency-grouping theory (Ref. 4) and extend it to the case of the detection of useful signals from regular correlated noise. A certain profile x is considered and it is assumed that the incident waves are recorded along x. The signal is in the form of a regular wave expressed by $f(t - x/v)$, where x/v characterises the delay of the wave at various points of the profile. The wave can be treated either as a function of time t for fixed values of x and v or as a function of x at fixed values $t = t_o$ and v. In the first case, the so-called t-representation is obtained, while the second case gives the so-called x-representation

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Frequency Theory of Grouping the Signals in the Presence of Correlated Noise

of the signal. It is also assumed that the wave or the signal is accompanied by a noise whose x-representation is expressed by $n(x)$. The total signal is thus given by:

$$g(x) = f(t_o - \frac{x}{v}) + n(x) .$$

The amplitude of the noise can be expressed by:

$$a = \sqrt{W_o}$$

where W is the average noise power which is represented by Eq. (2), where $W(\mu)$ is the noise-power spectrum. The correlation function of the noise is expressed by Eq. (3). A group consisting of N-receivers having a discrete sensitivity distribution function $h(k\Delta x)$, where k is

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Frequency Theory of Grouping the Signals in the Presence of Correlated Noise

the number of receivers and Δx is the distance between the receivers, is now considered. The periodic frequency characteristic of the group is expressed by:

$$H_{\Pi ep}(\nu) = \sum_{p=-\infty}^{\infty} H(\nu - 2p\nu_o)$$

where $H(\nu)$ is the spectrum of the envelope $h(x)$ of the discrete function $h'(k\Delta x)/\Delta x$; $2\nu_o$ is the repetition period which is equal to $2\pi\Delta/x$. The power spectrum density at the output is expressed by:

$$W_{Bb1X}(\nu) = W(\nu) \cdot \left| H_{\Pi ep}(\nu) \right|^2 \qquad (6)$$

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Frequency Theory of Grouping the Signals in the Presence of Correlated Noise

and the average output power is given by Eq. (7); these equations also define the amplitude at the output a_{Bb1X}. The output amplitude can also be approximately expressed by Eq. (8). For the special case when all the ordinates of the distribution function are identical and all h are equal, the output amplitude is given by:

$$a_{Bb1X} = ah\sqrt{N} \qquad (9)$$

where N is the number of receivers in the group. The efficiency of separating the useful signal from noise is defined by:

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E192/E382

Frequency Theory of Grouping the Signals in the Presence of Correlated Noise

$$\frac{A_{Bb1X}}{a_{Bb1X}} = \frac{\left| \frac{1}{2\pi} \int_{-\infty}^{\infty} \bar{F}(\nu) H_{\Pi ep}(\nu) \exp(i\nu x) d\nu \right|_{max}}{\left[\frac{1}{2\pi} \int_{-\infty}^{\infty} W(\nu) \left| H_{\Pi ep}(\nu) \right|^2 d\nu \right]^{1/2}} \tag{10}$$

where A_{Bb1X} is the peak amplitude of the useful signal; $\bar{F}(\nu)$ is the complex value of the signal spectrum $F(\nu)$, which is defined by the first equation on p. 770. The detection efficiency and the output amplitude as a function

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Frequency Theory of Grouping the Signals in the Presence of Correlated Noise

of Δx are illustrated in Figs. 2 and 4. From these results it is found that there exists an optimum value of Δx at which the amplitude of the output noise is a minimum. The author expresses his appreciation to G.I. Petrashen' for valuable advice. There are 4 figures and 5 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet imeni A.A. Zhdanova (Leningrad State University imeni A.A. Zhdanov)

SUBMITTED: November 21, 1959

GOL'TSMAN, F.M.

Statistical analysis of errors occurring in the experiments with detector grouping. Geol. i geofiz. no.12:86-99 '60. (MIRA 14:5)

1. Leningradskiy gosudarstvennyy universitet.
(Seismometry)

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9.9865 also 2406 2600 26978 S/049/60/000/012/002/011
3.9300 D214/D305

AUTHOR: Gol'tsman, F.M.

TITLE: Experimental analysis of interference and the reliability of results obtained with signal grouping

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya, no. 12, 1960, 1707 - 1716

TEXT: This is a continuation of the work reported on by the author (Ref. 1: Izv. AN SSSR, ser. geofiz., no. 6, 1960). As in the latter paper the seismic signals are looked upon as functions of two variables (x and t) and most attention is given to the x-representations of the signals and their spectra. The function $f(x; t)$ which represents the oscillations recorded on a seismogram, is assumed to be of the form $f(x; t) = f(t - x/v)$. It is shown that the grouping of the signals is equivalent to separation of the low-frequency components of the x-representations of the signal $f(x; t)$ at the output of the group. The optimum group configuration may be selec-

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ted by observing the two-dimensional spectrogram of the input signal in the $F(\nu; t)$ plane. As a result of grouping, the effective width of the x-representation spectra is reduced, so that the spectral criteria which govern the appearance of in-phase axes on the resulting seismogram are more easily fulfilled. The results of signal grouping are shown to be reliable, if the spectra of the corresponding x-representations of the useful signal and the interference are separated prior to grouping. The length of the in-phase axis should exceed the base of the group. The determination of the two-dimensional spectrogram $F(\nu; t)$ for the input signal where

$$F(\nu; t) = \int_{-\infty}^{\infty} f(x; t)\, e^{-i\nu x} dx$$

should provide information about the reliability of the final in-phase axes. The analysis of the signals may be reduced to determining the real $[A(\nu; t)]$ and complex $[B(\nu; t)]$ parts of the complex spectrum $F(\nu; t)$ for a given (in the form of a seismogram)

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Experimental analysis of ... S/049/60/000/012/002/011
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signal $f(x; t)$ at the input of the group. Knowing A and B as functions of ν it is easy to determine the spectrum $/F(\nu; t)/^2$ and, hence, estimate the energetic efficiency of grouping. However, instead of the two-dimensional functions $A(\nu; t)$ and $B(\nu; t)$ one can determine $A(\nu)_t$ and $B(\nu)_t$ by analysing the x-representations of the signal $f(x, t)$ at a particular time. In practice, the frequency analysis of the signal $f(x; t)$ can only be carried through in a finite interval of x and this interval is designated as the interval of analysis. Outside, this interval the function is assumed to be zero. The analysis of the $f(x; t)$ records should be carried out for a number of analysis intervals at different points along the x-profile. It is suggested that apparatus should be developed which would directly give the $F(\nu; t)$ spectrogram, and would be suitable for field measurements. The development of spectral methods of interpretation should not only eliminate difficult experiments on signal grouping but should also provide information about the reliability of the results obtained. There are 5 figures and 4 Soviet-bloc references.

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Experimental analysis of ... S/049/60/000/012/002/011
D214/D305

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova (Leningrad State University im. A.A. Zhdanov)

SUBMITTED: May 21, 1960

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9.9865 also 2406 2606 26979 S/049/60/000/012/003/011
3,9300 D214/D305

AUTHOR: Gol'tsman, F.M.

TITLE: Statistical estimates of the reliability of results obtained with signal grouping

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya, no. 12, 1960, 1717 - 1727

TEXT: The in-phase axes observed on a seismogram are an expression of the correlation between the values of a two-dimensional signal f(x; t) in the plane of the seismogram. It was shown that grouping is equivalent to filtration of x-representations of the signal. Since filtration is equivalent to the superposition of additional correlations on the signal, where the correlations depend on the properties of the filter only, it follows that the in-phase axes obtained as a result of grouping may be due to either the properties of the signal itself or of the group. The method put forward in the present paper is based on the num-erical estimation of the

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probability that the observed values of the signal $f_{out}(x; t)$ at the output of the group, giving rise to a given in-phase axis, may be due to uncorrelated random noise due to the smoothing effect of the group. The smaller this probability, the larger the reliability of the observed in-phase axes. The analysis is based on the general statistical theory of signals. The reliability N is defined by

$$N = \ln p_o - \ln p(\frac{y_2 \ldots y_m}{y_1}), \qquad (5)$$

where $p(y_2 \ldots y_m/y_1)$ is a probability density representing the probability that a signal $f_{out}(x; t)$ at points $(x_2; t_2) \ldots (x_m; t_m)$ assumes the given values $y_2 \ldots y_m$ if the value y_1 appears at the point $(x_1; t_1)$; p_o is the maximum value of p. Expressions are obtained in closed form for the reliability N which takes into account the experimental conditions and the method of grouping. Fig. 4

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Statistical estimates of the ... 26979 S/049/60/000/012/003/011
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shows the reliability N as a function of the apparent velocity in the case of a low-frequency filter (curve 1) and a band-pass filter (curve 2). A consideration of the reliability N will lead to a more rational design of experimental conditions. There are 4 figures and 5 Soviet-bloc references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova (Leningrad State University im. A.A. Zhdanov)

SUBMITTED: May 21, 1960

Fig. 4.

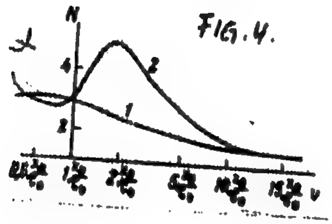

FIG. 4.

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3,9300 (1019, 1109, 1327)

28194
S/194/61/000/005/008/078
D201/D303

AUTHORS: Gol'tsman, F.M. and Keyl'man, Yu.N.

TITLE: A universal filter for seismic signals

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika. no. 5, 1961, 21-22, abstract 5 A161 (V sb. Prikl. geofizika, no. 25, M., 1960, 55-56)

TEXT: The theory is briefly explained of a universal filter with any pre-determined frequency response. A description is given of a filter in which an audio amplifier in the form of a delay line is used. This makes it possible to dispense with a preliminary recording and subsequent reproduction of signals being filtered. The total delay time of the signal in 120 LC sections of the delay line is 72 microseconds, frequency range 10-150 c/s. The amplitude response of amplifiers is linear for the range of input voltages 0-0.1 V. The output of the instrument was designed for connection to a normal loop oscillograph. The technique of using the instru- 4

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A universal filter for seismic signals D201/D303

ment is described and results of testing it are given. The possibility is emphasized of using the instrument in seismological investigations, in particular for frequency-separation of magnetic and gravitational anomalies. 7 figures. 5 references. [Abstracter's note: Complete translation]

Card 2/2

S/552/60/000/028/002/006
H000/H000

AUTHORS: Kalinina, T.B., and F.M. Gol'tsman

TITLE: Computer for determining the linear transformations of signals

SOURCE: Prikladnaya geofizika (sbornik statey), no. 28, 1960, 23-34

TEXT: An operational model computer for determining the "convolution integral" was constructed by the Leningrad Branch, VNIIGeofizika, in cooperation with the laboratory of elastic media dynamics of Leningrad University. Linear transformations of signals can be represented as an integral of "convolution":

$$F_2(x) = \int_{-\infty}^{\infty} F_1(x - x') \, h(x') \, dx';$$

$F_1(x)$ -- function to be transformed; $h(x)$ -- nucleus of transformation;

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H000/H000

Computer for determining (Cont.)

$F_s(x)$ -- resulting function. In practical computations, integral (1) is replaced by a sum of the form

$$F_s(x) \doteq \sum_{k=-\infty}^{\infty} F_1(x - k\Delta x)\, \Delta x h\, (k\Delta x),$$

$h(k\Delta x)$ -- the set of ordinates with curve $h(x)$ at equal intervals Δx. The frequency analogue of integral (1) is the expression

$$S_s(\omega) \approx S_1(\omega)\, H\, (\omega).$$

$S_1(\omega)$ and $H(\omega)$ -- spectra of the functions $F_1(x)$ and $h(x)$. This formula enables the computer to determine the linear transformations of the signals quickly and accurately. In most cases, the computation error does not exceed 3 to 4% of the maximum ordinate of the resulting function. This model can be much improved, partly by using refined potentiometers for R_1 and R_s, and by increasing the uncoupling resistances R_s. There are 7 figures.

Card 2/2

GOL'TSMAN, F. M.

Doc Phys-Math Sci, Diss -- "Fundamentals of the theory of interference reception of seismic waves". Leningrad, 1961. 25 pp, 20 cm (Inst of the Physics of the Earth imeni O. Yu. Schmidt, Acad of Sci USSR), 180 copies, No charge, 23 works of the author listed on pp 24-25 (KL, No 9, 1961, p 174, No 24239). [61-53890]

9,7000

S/194/61/000/011/019/070
D209/D302

AUTHORS: Kalinina, T.B., and Gol'tsman, F.M.

TITLE: Computer for determining the linear transformation of signals

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 11, 1961, 8, abstract 11 B52 (Prikl. geofizika, no. 28, M., 1960, 23-24)

TEXT: The principal diagram of a computer designed by VNII Geofizika intended for computing the convolution integral, and the constructional features of the device mock-up as well as the test results are described. In order to set the integrands, the device is provided with 2 groups of potentiometers which are interconnected by means of a special switch. The number of potentiometers in the second group is twice that in the first group. On connecting them to the potentiometers of the first group and returning to unit the convolution integral is obtained. The value of the

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integral is determined approximately from the sum of the corresponding values of the function and is simulated in a given scale by the current magnitude equal to the sum of currents of each potentiometer and indicated on a microammeter. The method of operation is described. Several examples of the use of this device in solving problems connected with linear transformations of signals are given: determination of analytical extension of potential functions and calculation of derivatives of functions given in graphical form. 4 references. [Abstracter's note: Complete translation]

B

GOL'TSMAN, F.M.

Theory of optimum reception of seismic signals. Report no.1.
Vop. din. teor. raspr. seism. voln no.4:121-132 '62.
(MIRA 15:10)

(Seismometry)

GOL'TSMAN, F.M.

Theory of optimum reception of seismic signals. Report no. 2. Vop. din. teor. raspr. seism. voln no.4:133-142 '62. (MIRA 15:10)

(Seismometry)

BIRMAN, A.Ye.; GOL'TSMAN, F.M.; KARTAVTSEV, S.M.; KVAL'VASSER, Yu.G.; NAKHAMKIN, S.A.

Seventeen-channel controlled directional device using delay lines. Vop. din. teor. raspr. seism. voln no.4:230-241 '62. (MIRA 15:10)

(Seismic prospecting—Electric equipment)

GOL'TSMAN, F.M.

Some incorrect explanations of the results of the frequency theory of grouping signals. Vop. din. teor. raspr. seism. voln no.6: 201-211 '62. (MIRA 16:7)

(Seismic prospecting)

KALININA, T.B.; GOL'TSMAN, F.M.

Theory of the optimum methods of determining the bedding elements of sample bodies in magnetometry when there is static. Izv. AN SSSR. Ser. geofiz. no.11:1591-1604 N '62. (MIRA 15:11)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.

(Magnetic prospecting)

SHTEYNGART, K.M.; GOL'TSMAN, E.M.

Some data on the mathematical treatment of muscular verbal stereotypes. Dokl. AN SSSR 152 no.5:1235-1238 O '63. (MIRA 16:12)

1. Institut fiziologii im. I.P.Pavlova AN SSSR i Leningradskiy gosudarstvennyy universitet im. A.A.Zhdanova. Predstavleno akademikom V.N.Chernigovskim.

GOL'TSMAN, Fedor Markovich; ALEKSEYEV, A.S., nauchn. red.

[Principles of the theory of interference reception of regular waves] Osnovy teorii interferentsionnogo priema reguliarnykh voln. Moskva, Nauka, 1964. 283 p. (MIRA 17:12)

GOL'TSMAN, F.M.; FAN YUN'-FEY [Fang Yun-fei]

Statistical theory of the optimum reception of a packet of regular waves. Izv. AN SSSR. Ser. geofiz. no.7:978-979 Jl '64. (MIRA 17:7)

1. Leningradskiy gosudarstvennyy universitet imeni Zhdanova.

GOL'FSMAN, F.M.; FAN YUN'-FEY [Fang Yün-fei]

Optimum reception of signals and analysis of the statistical properties of disturbances. Izv. AN SSSR. Ser. geofiz. no.8: 1142-1148 Ag '64. (MIRA 17:8)

1. Leningradskiy gosudarstvennyy universitet imeni A.A.Zhdanova.

ACC NR: AM5009843 MONOGRAPH UR/

Gol'tsman, Fedor Markovich

Fundamentals of the theory of regular wave interference reception (Osnovy teorii interferentsionnogo priyema regulyarnykh voln) Moscow, Izd-vo "Nauka", 1964. 282 p. illus., biblio. 2,800 copies printed.

TOPIC TAGS: seismic wave, seismology, correlated noise, signal correlation, signal interference, signal noise separation, signal reception

PURPOSE AND COVERAGE: This book deals with the theory of directional reception of regular seismic waves in the presence of noise. The frequency theory of regular wave generation is described, and the synthesis of interference systems for the separation of signals is discussed in detail. The generation of regular waves in the presence of irregular interference is studied from the standpoint of the statistical theory of reception. The book is intended for engineers and scientific workers in the field of seismology and seismographic geophysical exploration, and in departments of physics concerned with wave propagation in complex media. The author thanks G. I. Petrashen', Dr. of Physicomathematical Sciences, Academician Yu. V. Linnik, and A. S. Alekseyev, the scientific editor, for their useful advice and comments.

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